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ABSTRACT

This study investigated sibling interaction patterns in middle childhood as predictors of adjustment outcomes in males during adolescence and early adulthood using a social interactional perspective. It was theorized that negative interaction during middle childhood with siblings and parents would be the most powerful predictor of adjustment in adolescence and early adulthood. The results of the study showed that this was indeed the case when analyzing four specific factors. In the area of antisocial and delinquent behaviors, juvenile crime was predicted by mothers' high rate of coercive behavior, and adult arrests were consistent with negative behaviors with siblings during middle childhood. In the area of psychopathology, coercive behavior with siblings created an adult with a strong sense of inadequacy, incompetence, and hostility. In the area of hostility toward women, coercive behavior with siblings strongly predicted hostility toward women. Finally, in the area of conflict resolution, early coercive behaviors were likely to be continued in adulthood when dealing with parents, partners, and friends. The findings also suggested that if parents are unable to supervise and discipline an antisocial child, he or she is likely to victimize his sibling or siblings at a high rate. (Contains 57 references.) (SD)

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Negative Sibling Interaction Patterns as Predictors of Later Adjustment Problems in Adolescent and Young Adult Males*

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It is well known that sibling outcomes with antisocial behavior and delinquency are highly intercorrelated (e.g., Patterson, 1984; West & Farrington, 1973). The actual mechanism through which sibling interactions may contribute to later behavior is of substantial interest to us, but is as yet unclear. As viewed by social interactionists, the exchanges between siblings and an aggressive child in the family are prime determinants for future antisocial behavior (Patterson, 1984, 1986b). From this viewpoint, the aggressive child and the siblings share a similar environment, and their reactions to each other may determine patho-

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logical outcomes. It is also our position that in those families in which children develop antisocial behavior patterns, the home environment with unskilled parents may become so homogeneous that all family members are altered to become increasingly similar in their use of coercive behaviors with each other.

Similarities in siblings' behavior have been found both by observational measures and ratings by others. Patterson (1984) pointed out that the observed rates of siblings' coercive behavior at home by definition must correlate in that, in large part, they reflect the coercive reaction of one child to another; in effect, the two numbers define a kind of dyadic trait. High-magnitude correlations among siblings were also obtained in a recent study of elementary school-age children (Lewin, Hops, Davis, & Dishion, 1993). When peer ratings of negative behaviors were the criterion, the correlation between same-sex siblings was .65. The magnitude of this correlation is considerably larger than the range of .20 to .38 found in the large-scale survey by Sells and Roff (1967) for ratings of degree of acceptance.

For teachers' ratings of likability, the sibling–sibling correlation was $r = .55$, and correlations of similar magnitude were obtained for observational data describing prosocial behaviors occurring in the classroom and on the playground (Lewin et al., 1993). In addition, delinquency rates covary significantly among siblings such that a small number of families account for the bulk of delinquent behavior in any given community. For example, West and Farrington (1973) found that for a base rate of delinquency of .20 for an inner-city sample, the likelihood of a recorded law violation for a boy with a delinquent older sibling was .67; for a boy with a delinquent younger sibling, it was .69. Similarly, researchers observing the interactions of young siblings have found high orders of reciprocity in sibling pairs. Lamb (1978), for example, found that prosocial acts (e.g., smiling and approaching) and the less social act of taking the sibling's toy correlated about $r = .67$ for siblings. Abramovitch, Corter, and Lando (1979) also found high rates of mutuality among young siblings: Older siblings usually initiated aggressive and prosocial interactions, whereas younger siblings typically reciprocated in kind. These results were replicated in a longitudinal study in which the rates of reciprocally aversive behavior by younger siblings steadily increased as they were followed from age 18 months to age 5 years (Abramovitch, Corter, Pepler, & Stanhope, 1986).

The issue of magnitude of similarity among siblings is im-

portant because of its contribution to the ongoing debate about the level of shared environment in the socialization of children from the same families. Several studies have suggested that shared environmental effects on children's behavior are of very low magnitude, the majority of variance being explained by genetic and unshared environmental effects. Patterson's (1982) coercion model specifies very high orders of shared environment and specifies the quality of interactions and products that follow from it. If one child is antisocial, the others are also at higher risk to be so identified; similarly, if one child is delinquent, the others are likely to be. Based on their extensive review of the literature, Rutter et al. (1990) have also commented on the fact that estimates of heritability for delinquency (official records) strongly suggest high orders of shared environmental influence.

The high order of covariation for levels of social behaviors among siblings is in direct contrast to findings cited in reviews by behavioral geneticists such as Plomin (1986) and others (e.g., Daniels, Dunn, Furstenberg, & Plomin, 1985; Dunn, 1983; Dunn & Sherrod, 1988; Reiss, Plomin, & Hetherington, 1991; Rowe & Plomin, 1981; Scarr & Grajek, 1982). In his review, Plomin (1986) found that sibling correlations—based primarily on parent and sibling self-reports—were consistently less than .20 for personality variables. This low order of magnitude is consistent with the correlation of .16 reported by Ahern, Johnson, Wilson, McClearn, and Vandenberg (1982).

There is reason to believe that low estimates of shared environmental variance for children's social behaviors might be premature. Most of the early work was based on data from mothers' reports on questionnaires about their children. As Graham and Stevenson (1985) noted, however, estimates of heritability for children's social behavior varies as a function of sex of child and reporting agent. For example, the data showed reasonable convergence in estimates for general behavior disorder for girls when using reports from mothers, fathers, and teachers. For boys, the estimates of concordance tended to be much lower and very different, depending on who the reporting agent was. Similarly, Lyttón, Watts, and Dunn (1989) showed heritability estimates for child antisocial behavior for 9-year-olds that ranged from 76% based on teacher data, 40% based on mother report, and 0% based on father data. Incidentally, Lytton's (1977) report showed very little heritability when using observational data for 2-year-olds. Clearly, estimates of concordance,

heritability, and unshared environmental variance are important concepts, but the role these variables play in socialization theory has to await resolution of the fact that their estimates for all the variables seem to vary as a function of agent and method used to collect the basic data.

As Hoffman (1991) correctly argued, there are many factors that create similarities and others that create differences among siblings. The question is *why* any two siblings are different or similar. As viewed by behavioral geneticists, children growing up in the same families may share no more similar environmental experiences than do children taken at random (Plomin, 1986).

It is the purpose of this chapter to focus on sibling interaction patterns in middle childhood as predictors of adjustment outcomes in males during adolescence and early adulthood. Our presentation here is based on the social interactional perspective. We believe that families characterized by high densities of coercive exchanges define a homogeneous social environment shared by all its members, parents, and siblings alike. Thus, it is our expectation that in coercive families the shared environment is extremely high. For example, 6 to 10 observations in the homes of a sample of families of aggressive boys showed a median correlation of .69 for the covariation of the rate of coerciveness among all family members (Patterson, 1982). An extremely coercive sibling reacts to extremely coercive parents and siblings. In fact, in 40% of these exchanges, a coercive child reacted to both a sibling and a parent! Observation data collected in the home demonstrate that aggressive children and their siblings are part of the same process of coercive exchanges, *and* that their levels of coerciveness correlate highly. Furthermore, both the siblings and the coercive child demonstrate significantly higher levels of observed aggressive behavior in the home than do children from nonclinical families (Arnold, Levine, & Patterson, 1975). In their study of 27 families referred for treatment, the mean observed rate of coercive behavior was .76 behaviors per minute for the target children and .56 per minute for the 55 siblings. In contrast, the mean for a matched sample of boys from nonclinical families was .27 rpm. Not only were the siblings twice as aversive as boys from nonclinical families, but the clinical families with the highest rate aggressive boys also contained the highest rate siblings (r = .74). The Arnold et al. (1975) findings were recently replicated by Dadds, Sanders, Morrison, and Rebgetz, (1992), who found "remarkable" similarities in levels of siblings' deviant be-

havior in a clinic-referred group. Siblings of depressed and mixed-disorder brothers and sisters were more similar to the comparison group siblings. For a nonclinical sample, Patterson, Dishion, and Bank (1984) found a correlation of .43 among siblings for deviant behavior.

SIBLINGS AS AMPLIFIERS AND TRAINERS FOR HIGH-AMPLITUDE AGGRESSION

We believe that parents of aggressive children inadvertently reinforce the child for coercive behaviors such as noncompliance, temper tantrums, yelling, whining, arguing, and hitting. For a coercive preadolescent, these behaviors form about 13% of the interactions with family members, as compared to about 5% for nonreferred boys (Patterson, 1984). Similarly, Shinn, Ramsey, Walker, Steiber, and O'Neill (1987) found that, on the playground, about 10% of 5th-grade aggressive boys' interactions were negative, as compared to about 4% for comparison boys. It is curious that such a small portion of the child's repertoire becomes so salient in determining the future trajectory of the aggressive child (Ramsey, Bank, Patterson, & Walker, 1993; Ramsey, Patterson, & Walker, 1990). We believe that sibling interactions constitute a significant portion of the aggressive child's experience in learning to use antisocial behaviors. His or her coercive behaviors are followed by reinforcing contingencies that describe a form of escape conditioning or negative reinforcement (Patterson, 1982; Snyder & Patterson, 1986, 1992). That is, there is a sequence of negative interactive behaviors followed by the sibling giving up and either going along with the wishes of the coercive child or leaving the situation. There is also evidence that siblings, and later on peers, provide a substantial amount of positive reinforcement for antisocial acts (Dishion, Patterson, Poe, Griesler, & Andrews, 1992; Patterson, Reid, & Dishion, 1992).

Most theories of child development and child pathology are parent centric. Traditionally, interactions with the parents are thought to be the major determinant of pathological outcomes (Conger et al., 1992, 1993; Patterson, 1982, 1986a; Patterson & Bank, 1986, 1989). According to the coercion model, it is some combination of a difficult toddler and a marginally effective parent that sets in motion the process of the child's aversive be-

havior being negatively reinforced (Patterson, 1982). The irritable parent who backs off when the child behaves coercively can quickly produce an oppositional preschooler. For example, observation data showed that when either the mother or father was interacting with the sibling of the coercive child, there were no significant differences between comparison families and families of socially aggressive and abused boys (Patterson, 1982). Thus, the identified target child may occupy a very special niche in these families. When the interactions with the coercive boys were included in the analyses, however, the differences among nonclinical and clinical samples were highly significant. Whatever it is that the parents are doing with the coercive child, they are evidently not doing it with his or her siblings. These data are consistent with the theory and findings of Plomin (1986) and his colleagues. Thus, it may be that parents and siblings have similarly aversive relationships with the aggressive child in the family, but enjoy more positive interactions with one another. It is also possible that siblings—especially poorly supervised siblings—create a shared environment of their own in which their parents do not typically participate.

Indeed, parents permit significantly high levels of coercive interaction among siblings. For example, negative interactions between siblings are all right, so long as it does not involve the mother or father (Patterson, 1982). In a series of studies, Patterson, Reid, and their colleagues found the coercion rates for siblings from clinical samples to be at least 50% higher than coercion rates for siblings from nonclinical families. Siblings were involved in 59% of all child coercive episodes, and this percentage did not differentiate nonclinical from clinical samples. On the other hand, parents were involved in more than 80% of the coercive episodes with clinic-referred children (Patterson, 1984). This suggests that quite often the sibling and the parent contribute together to the shaping or "training" of the coercive child. What are their relative contributions to this process?

Note, as depicted in Figure 9.1, that the coercion model, which posits a direct path from Unskilled Parenting Practices to Child Antisocial Behavior, has embedded in it the microsocial variables, negative intrusions to the aggressive child (or "startups"), and negative reinforcement of the aggressive child's coercive behavior (or "backoffs"). These variables represent the moment-to-moment microsocial exchanges between parent and child and between siblings. As implied by the figure, it is expected that parent and sibling interactions provide literally

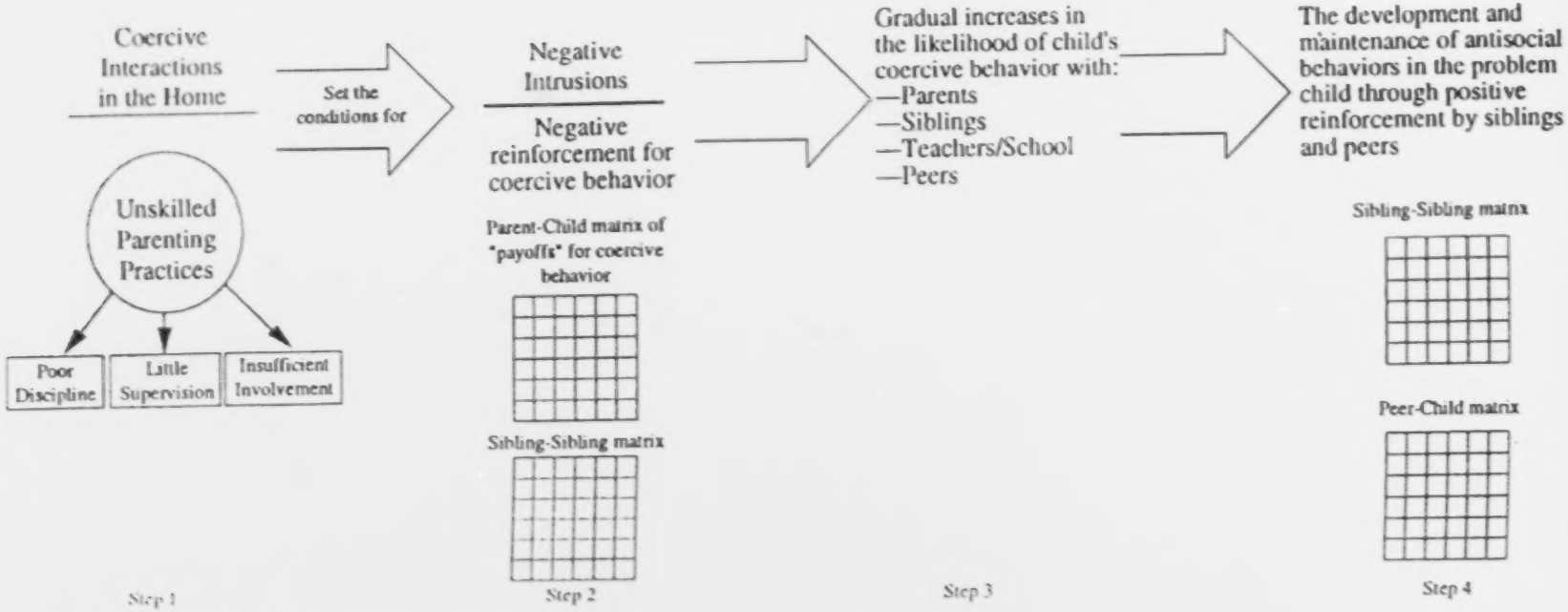

FIGURE 9.1 Theoretical framework for development of antisocial behavior.

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thousands of opportunities for a child to discover what works best in getting what he or she desires. In families with high levels of coercive interchanges, a gradual increase in the use of these "high-paying" behaviors is expected. Upon entering school, individuals with high rates of coercive behaviors are typically rejected by their nonaggressive peers. Coercive children tend to form their own "deviant" peer groups, in which antisocial behavior is positively reinforced by the group. In families with high levels of coercive behavior, siblings are also hypothesized to encourage (i.e., positively reinforce) antisocial behavior as shown in the last step in the model.

We hypothesize that the coercive style of coping with the social environment becomes a salient feature of the child's socialization process. Such an environment sets up a chain of negative consequences for the child. For example, as shown by Ramsey and associates (1990), the effects of high rates of child-coercive behavior in the home generalize to the school. The structural equation model showed a path coefficient of .73 for the antisocial behavior construct measured in the home at grade 4 to antisocial behavior in a variety of school contexts assessed at grade 5. The effect of this generalization is almost immediate, as shown by several studies of nonaggressive peer groups. Within a matter of days or weeks, it is very likely that the aggressive child will be identified and rejected by nonaggressive peers (Coie & Kupersmidt, 1983). In the Oregon Youth Study (OYS) data set, the probability of boys above the median on antisocial behavior being rejected by peers was .75 at grade 4. In addition, the likelihood of the boy who was above the mean on a multiple-indicator antisocial construct at grade 4 being rejected by peers at grade 6 was .60 (Patterson & Bank, 1989). This result was replicated in a second sample (Bank, 1990). The coercive interpersonal style is a determinant for rejection by peers. Coercive boys are also at risk for academic failure. Findings from OYS for at-risk boys in grade 4 showed very strong correlations (r = .50) between antisocial behavior and academic failure (Patterson, 1986a). As shown in Figure 9.1, it is expected that boys who are both coercive and rejected are at greater risk for academic failure. Patterson and Capaldi (1991) showed that peer rejection and academic failure were correlated with low self-esteem, and Patterson and Stoolmiller (1991) found boys' depressed mood to be significantly predicted by peer rejection and academic failure.

In the current study we examine the predictive power of the early sibling/coercive-child relationship on a set of criterion vari-

ables for the coercive child, including later law violations and psychological adjustment in adolescence and young adulthood. At the same time, we compare the sibling's contributions to those of his or her parents. Therefore, it is hypothesized that the specific interaction patterns of both siblings and parents with a coercive child will have statistically significant and unique impacts on the coercive child's later adjustment. In particular, negative intrusions (or "startup") and negative reinforcement (or "backoff") are expected to be key behaviors in childhood that will best predict problems in later adjustment. Negative sibling interaction (fighting or "synchronicity") is also expected to be a key predictor variable. In comparison families with no antisocial child (but with siblings of similar age as those in the referred families), no such relationship is expected to occur. The hypotheses were tested on a sample of males referred for antisocial behavior and a nonreferred comparison group.

METHOD

Study Description

This study was longitudinal in nature, with the first wave of data collected in a series of treatment studies from 1964 through 1980. Participants were either brought by their parents to the Oregon Social Learning Center (OSLC) for treatment in dealing with their antisocial behavior or were members of families recruited to serve as nonclinical comparisons. Many of the referred group participants attended only a few treatment sessions, but participated at baseline during Wave 1 and again at Wave 2. Thus, the Wave 1 data are considered *predictor* variables. Intake and demographic information, observational data, and parents' daily reports were all included in the predictor variable set. In the second data collection wave, the *criterion* variables were measured with the aid of additional funding in 1987 and 1988, and consisted of an in-depth interview, questionnaires, and arrest records.

Subjects

The OSLC database from early studies included records from 295 families with boys in the 4 to 12 age range; of these, 121 of

the boys were socially aggressive and 106 were nonaggressive comparisons. The remaining 68 boys had participated in either a study of child abuse or a study of parent daily-report reliability and validity. Some of these youngsters were not yet 13 by the start of Wave 2, and for some others observational data had not been collected or were incomplete. The majority of Wave 2 participants were contacted in a pilot study and compared to those from the Wave 1 sample we were unable to contact. The participant and noncontact groups were quite similar, except that, among the treated, socially aggressive boys, the noncontact group had more therapy dropouts than the participant boys.

All together, 116 boys and men completed their participation in Wave 2: referred for treatment for aggressive behavior at Wave 1, adolescent at Wave 2, $n = 32$; normal comparison at Wave 1, adolescent at Wave 2, $n = 23$; referred for treatment of aggressive behavior at Wave 1, adult at Wave 2, $n = 34$; and normal comparison at Wave 1, adult at Wave 2, $n = 27$. Seventeen additional boys and men agreed to participate, but we lacked sufficient funding to continue the Wave 2 data collection process. The interwave interim ranged from 5 to 20 years, with a mean of approximately 10 years.

Measures

Predictor Variables

Family Interaction Coding System. This observational system was initially developed in the 1960s (Patterson, Ray, Shaw, & Cobb, 1969; Reid, 1967) and was continuously refined and evaluated during the 1970s (e.g., Jones, Reid, & Patterson, 1975; Reid, 1970, 1978; Taplin & Reid, 1973). The system has demonstrated consistent usefulness in discriminating between (a) children referred for antisocial conduct and matched control youngsters, (b) parents of socially aggressive youngsters and parents of nonaggressive youngsters, and (c) child abusive parents and nonabusive parents. It also has repeatedly demonstrated sensitivity in measuring treatment effects in antisocial and abusive families.

This coding system was designed to provide a sequential account of family interaction in the home. During observation periods, each member of the family served as the focal subject for at least two 5-minute periods. All behaviors of the focal subject and all the reactions and interactions from other family mem-

TABLE 9.1 FICS CODE CATEGORIES GROUPED BY COMPOSITES

Aversive (TAB)	Neutral (NEU)	Positive (POS)
*Command Negative	Command	Approval
Dependency	Cry	Attention
Destroy	No response	Compliance
Disapproval	Receive	Indulge
High Rate	Self-Stimulation	Laugh
*Humiliate		Normative
Ignore		Physical Positive
Negativism		Play
Noncompliance		Talk
*Physical Negative		Touch
Tease		Work
Whine		
*Yell		

*Denotes the abusive cluster.

bers to the focal subject were coded at 6-second intervals using 29 defined behavioral categories (see Table 9.1). Thirteen of these categories define aversive behavior (e.g., hit, whine, tease, and noncomply). The abusive cluster is a subset of the 13 aversive behaviors: command negative (threaten), humiliate, physical negative (hit or other negative contact), and yell. The remaining two categories cover prosocial and neutral behaviors such as play, talk, laugh, comply, and work.

The observational data were summarized to provide rate-per-minute scores for individual or group behaviors. They can be used to provide estimates of the duration of behavior and can be analyzed sequentially to determine the conditional relationships of behaviors among interactants. Total aversive behavior (TAB) is the aggregate rate-per-minute of all 13 aversive behaviors for a given subject. Conditional probabilities of interest are between two interactants. They include *startup*—the probability that neutral or positive behaviors will be followed by a negative one; *synchronicity*—the probability that a negative behavior will be followed by another negative behavior; and *backoff*—the probability that a negative behavior will be followed by neutral or positive behavior.

Parent Daily Report Data. The Parent Daily Report (PDR) is an instrument that was developed to supplement home observational data on aggression. In addition to providing data from a different agent (i.e., the mother versus trained observers), it also provides data on low base-rate aggressive acts, such as fighting.

firesetting, vandalism, problems at school, and so on, that would not be observed during a home observation session. Its psychometric characteristics were recently evaluated by Chamberlain and Reid (1991), and both interparent reliability and temporal stability were demonstrated over a 1-month period.

The PDR consists of a set of 30 items that label a broad spectrum of aversive child behaviors. Each day a parent (usually the mother) is asked whether each of the 30 behaviors happened on that day. The parent does not try to recall the rate of occurrence, but only states whether the behavior occurred. The parent is called over a 2-week period (between 6 and 12 calls depending on the study). The data have been used to provide a rate per day of parent-reported child problems.

Intake: Child Problem Checklist. This checklist includes the same behavioral items as does the Parent Daily Report inventory. When parents initially come for assessment or treatment, they are asked to indicate which of the child's behaviors are particularly problematic for them. Parents of children referred for conduct disorders report over twice the number of problem behaviors than do nonreferred comparison families (Lorber, 1981).

Observer Impression Inventory. The Observer Impression Inventory was designed by Reid, Brummett, and Condon (1973) to gather systematically home observers' subjective impressions of family characteristics and behavior. The 25 items that comprise the Observer Impression Inventory include the following areas: naturalness of behavior, friendliness, hostility toward other family members and the observer, parents' attitudes toward their children, family control mechanisms, family organization, parental dominance, child abuse, and treatment prognosis.

In a study by Weinrott, Reid, Bauske, and Brummett (1981), the instrument was evaluated to assess its reliability and factorial composition. Two clustering algorithms were used, in which four clusters emerged: hostility, family disorganization, child aggression, and parent reactivity. Coefficients alpha (Cronbach, 1951) and beta (Revelle, 1979) suggested adequate internal consistency for all four clusters.

Wave 2 Criterion Variables

Target Subject Structured Interview. During the structured interview, subjects were asked to report on their own delin-

quent and aggressive behavior over the preceding year. The self-report instrument used was developed by Ageton and Elliott (1978) for the National Youth Survey, which included a national probability sample of adolescents. Our own research shows that randomly sampling 20 subjects to complete the self-report instrument twice yielded test–retest correlations of .873 for the total score.

The following questionnaires were completed at the interview.

Official Court Records. All existing records were obtained from both juvenile and adult court actions for each participant. Thus, for those subjects under 18 years of age, only juvenile data exist; for the young adult group, juvenile and adult data were collected. Records for Oregon, Washington, California, and Idaho were gathered as necessary.

Brief Symptom Inventory. The Brief Symptom Inventory (BSI) is the short form of the Hopkins Symptom Checklist SCL-90-R; Derogatis & Cleary, 1977). It is a self-report instrument comprised of 53 items designed to assess symptoms of psychopathology. Subscales include somaticizing, obsession, internalizing, depression, anxiety, hostility, phobic, paranoia, psychoticism, and a global severity index (GSI) of psychopathology.

Hostility Toward Women Scale. This 30-item attitude measure assesses the target subject's hostility specific to females. This measure has been shown to have reasonable reliability and validity and to relate to rape arousal and measures of behavioral aggression (Check & Malamoth, 1983).

The Conflict Tactics Scale. The Conflict Tactics Scale CTS; Straus, 1979) provides measures of three different conflict resolution tactics that were derived using both theoretical and factor-analytic methods: (a) *Discussion (DIS)*—the use of rational discussion and argument; (b) *Low amplitude coercive (LAC)* acts through verbal aggression—The use of verbal or symbolic means to hurt another (e.g., insults and threats of violence); and (c) *High amplitude coercive (HAC)* acts through physical aggression—The actual use of physical force. Some investigators have reported and used a fourth factor that includes items regarding the use of knives and guns and other extremely violent acts used to "resolve" disagreements. Virtually none of these items were endorsed by participants in the current study.

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The internal consistency of the CTS is moderate to high; the reasoning factor shows the lowest reliability levels (.50–.76), but the alpha coefficients for the other two factors are in the .70s and .80s.

Design

The study was conceptualized as a 2 × 2 design with age at Wave 2 (13 to 18 and 18 to 30) and clinical status at intake (referred for treatment versus nonreferred comparison) as the independent variables; the Wave 2 indicators for the four adjustment outcomes are the dependent variables. Due to the longitudinal nature of this study, it is of particular interest to examine the Wave 1 home observation data as predictor variables and the Wave 2 arrest histories and questionnaires as criterion variables.

Analysis Strategy

Correlational analyses between Wave 1 predictor and Wave 2 criterion variables were conducted. Use of the full sample can be misleading when referred/treatment versus comparison groups differ markedly in their correlational patterns. Thus, for most analyses, the referred and comparison group results were reported separately. An exception to this rule is reporting adult arrests because half of the sample was under 18, and the nonreferred comparison participants were statistically no less likely to be arrested as adults than the referred participants. Therefore, the subset of participants 18 and over was used for those analyses.

A related issue with the current data set is sample size. The referred group (RG) includes 66 subjects, whereas the nonreferred comparison group (NC) includes 50 participants. The Wave 2 data were virtually complete for the BSI and the Check Hostility scales, but participants were asked to complete the Conflict Tactics Scale (CTS) only where appropriate. Some participants said that they did not have an active relationship with either of their parents, whereas others had only known one parent. In addition, only those 18 years of age and older were asked to complete the CTS for partner and friend; about 25% of these participants had no partner or close friend within the 12

months prior to completing the measure. They were not asked to complete those parts of the CTS. For parents, only Wave 1 mother data were used because many fathers had not been available to participate.

Wave 1 data were incomplete in that not all participants had observational data, and in some cases the archived data did not include all variables necessary for the analyses. As a result of these difficulties, the effective sample size for Wave 1 to Wave 2 prediction analyses was reduced to $n = 48$ for the RG and $n = 38$ for the NC groups.

Given these diminished sample sizes and the two age groups—adolescent versus adult—we decided not to use multivariate statistical analyses. Therefore, the predictive contributions of sibling versus parent Wave 1 variables must be evaluated in this data set with comparisons of zero-order correlations. These analyses are reported separately for the various adjustment outcomes.

RESULTS

Antisocial and Delinquent Behavior

Table 9.2 contains the predictive validities from Wave 1 variables to juvenile and adult arrest records. Of the 116 participants, 42 were arrested at least one time as juveniles; of the 61 participants who were age 18 or older at Wave 2, 18 had been arrested at least once as adults. There was no difference in juvenile delinquency prevalence between the under 18 (36%: 20 arrested, 35 not arrested) and over 18 (36%: 22 arrested, 39 not arrested) groups, but statistically, significantly more of the referred boys (29 of 66) as compared to the nonreferred comparison boys (13 of 50) developed juvenile records, $X^2_{(1)} = 3.96$, $p < .05$. Among the 61 boys who had reached maturity by Wave 2, however, there was no significant difference in adult arrest prevalence, with 11 of the originally referred and 7 of the comparison boys having accrued one or more recorded arrests. Of the 11 referred boys arrested as adults, 6 had also been arrested as juveniles, whereas 5 had not been arrested then; in the NC group, three of the seven with adult arrest records also had juvenile records. It should be emphasized that referred boys were accepted into the Wave 1 studies only if observed

TABLE 9.2 PREDICTION OF JUVENILE AND ADULT ARRESTS[a]

	Juvenile Arrests				Adult Arrests 18+ only)	
	Referred	Nonreferred Comparison		Full Sample		
	Interval	Interval	Nominal	Interval	Interval	Ordinal
Intake Problems	[10][b]	(39)[d]	52[d]	31	43[d]	55[d]
Child Total Aversive Behavior		[13]	(24)		45	(23)
Child Abusive Cluster	19			23	42	(27)
Mother Total Aversive Behavior	26	(21)	37	32	(20)	(25)
Mother Abusive Cluster	(15)[c]	(15)	(16)	(18)	49	35
Target Boy Startup with Mother	29	33	46	35	35	36
Target Boy Startup with Siblings	[11]			(15)	43	38
Target Boy Startup with Female Siblings	(23)			25	53	(20)
Target Boy Neg Synch with Mother	(16)		35	(21)	48	33
Target Boy Neg Synch with Siblings	(23)			[14]	83	58
Target Boy Neg Synch with Female Siblings	[10]		32	(15)	85	46
Mother Backoff	34	[11]		24	(-20)	(-29)
Observer Impression: Family Chaos	39	[12][d]	[18][d]	35	63[d]	61[d]
Observer Impression: Target Boy Agg	33	[13][d]	41[d]	35	56[d]	43[d]

[a]All correlations are significant at *alpha* = .05 unless otherwise noted.
[b]Bracketed numbers indicate nonsignificant correlations ($p > .20$) that may be of interest to the reader.
[c]Numbers in parentheses indicate marginally significant correlations ($.05 < p < .20$).
[d]$n = 22$. Observer impressions inventory and intake problems checklist were not yet in use in the late 1960s and early 1970s when many of the older participants were observed at Wave 1.

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rates of total aversive behavior (TAB) at home equaled or exceeded those previously found for highly antisocial boys (about one antisocial event every 3 minutes). The NC boys were admitted to those studies without reference to their TAB rates, but they averaged one such event every 6 or 7 minutes, whereas the RG boys averaged nearly one event every 2 minutes.

Juvenile Arrests

Note in Table 9.2 that predictions of both juvenile and adult arrest records are included. For juvenile arrests, RG and NC validities are presented first, and they are followed by the full sample coefficients. Also note that with juvenile arrests, the NC results are listed in two columns: Pearson product-moment correlations with number of arrests (assuming an interval scale) as the criterion variable, and point biserial correlations with arrested or not arrested (assuming a nominal scale) as the criterion. This comparison is useful because the majority of NC boys with a juvenile arrest record were arrested only once; the five NC boys with more than one arrest still had very few. On the other hand, 75% of the RG boys with juvenile records were arrested more than once, and about half of those multiple offenders were arrested six times or more.

With the juvenile arrest data, the predictor variables that worked best were (a) observer impressions of the frequency of coercive acts by the targeted boy in each family during home observations; (b) rate of mother aversive behavior ($Mom_{(TAB)}$) observed in the home at baseline; and (c) conditional probabilities calculated from baseline home observations, including the target boys' "startups" with his mother and siblings and synchronous negative exchanges with siblings. Thus, observed negative interactions at home during middle childhood were significant predictors of later delinquent acts during adolescence. Furthermore, these negative interactions occurred with both mothers and siblings.

Adult Arrests

All but three of the adult offenders had multiple arrests. Several of these multiple offenders, however, had large numbers of adult arrests, and these outliers tended to inflate correlations

when actual numbers of arrests were used as the criterion variable. Therefore, an ordinal scale was developed with zero arrests, one or two arrests, and three or more arrests as a 3-point scale. Results with both the interval level and ordinal scoring are presented in the table because the inflated correlations with interval data are apparently based on the fact that those individuals with large numbers of adult crimes tended to be highly coercive in their home settings when observations were conducted many years prior to their adult arrests.

We find the adult arrest data to be quite compelling. Every coefficient is either statistically significant or closely approaches statistical significance. As noted earlier, correlations based on the raw arrest scores (interval level) are artifactually elevated due to the presence of three individuals with large numbers of adult arrests (34, 12, and 12) who also had very high negative interaction scores with their sisters. Although the three-category ordinal scoring of adult arrests provides more reasonable estimates of predictive validity, it is important to note that the almost uniformly higher correlations with actual numbers of arrests are due to the fact that individuals with the worst adult criminal records were typically observed in middle childhood to be highly negative in their interactions with their mothers and siblings. Synchronous negative interactions with siblings account for the largest amount of criterion variance, but negative interactions with mothers also account for significant criterion variance. Further breakdown of the adult subsample into RG and NC participants resulted in similar magnitude coefficients for the synchronous negative interaction variables. For the startup and rate (total aversive behavior and abusive cluster) variables, however, RG coefficients remained significant, but NC coefficients were consistently nonsignificant.

There was one interaction with mothers, however, that resulted in somewhat puzzling results. Note that mother "backoff" is the conditional probability of positive or neutral behavior from a mother given aversive behavior by a family member. Mother backoff predicts juvenile arrests in the expected direction for the RG participants; that is, parental reinforcement of a child's aversive acts is predictive of delinquency. For those participants who were over 18 years of age at Wave 2, however, mother backoff in middle childhood appears to function as a protective factor, with negative prediction of adult arrests that approaches statistical significance. Furthermore, the coefficients are of a similar magnitude for the adult RG and NC participants.

Self-reported Delinquency

Predictive validities for self-reported aggression and law violations as reported on the Elliott scale (Ageton & Elliott, 1978) were typically of low magnitude. The single variable that predicted the Elliott score significantly for both groups was mother startup, $r = .34$, $p < .05$ for NC; $r = .31$, $p < .10$ for RG. The number of problems reported by parents at baseline worked well with the NC group, $r = .47$, and sister startup worked best for RG, $r = .40$, both $p < .05$. Other correlations did not differ significantly from zero.

Self-reports of Psychopathology as Adolescents and Young Adults

Predictions of the Brief Symptom Inventory (BSI) scales at Wave 2 are shown in Tables 9.3a and 9.3b. These results are striking in several ways. First, predictive validities from middle childhood to adolescence and young adulthood for the RG subjects (Table 9.3a) are powerful across all areas of psychopathology assessed, but this is not the case for the NC participants (Table 9.3b). Second, the best predictors of RG psychopathology are the negative sibling interaction variables, including startup and synchronous negative behaviors. The same variables, however, have absolutely no predictive power for the NC group. Third, mother backoff is the only Wave 1 variable that predicts self-reported psychopathology in the NC group, but this variable exhibits no predictive power with RG participants. Note that the global severity score (GSI) is well predicted for the RG by child total-aversive behavior, startup, and synchronous negative behaviors with siblings, whereas the GSI is significantly predicted for the NC only by mother backoff ($r = .31$). The boys' Wave 1 startup with siblings is the best predictor of global severity, $r = .57$, for the RG participants.

Self-reports of Hostility Toward Women During Adolescence and Young Adulthood

The Check Hostility Scale (CHS) was completed by all participants at Wave 2. In Table 9.4, the RG boys' responses to the Check measure are well predicted by Wave 1 observational data

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TABLE 9.3A WAVE 1 PREDICTION OF WAVE 2 BSI SCORES FOR THE REFERRED GROUP (n = 48)[a]

	SOM	OBC	INT	DEP	ANX	HOS	PHO	PAR	PSY	GSI
Intake Problems										
Child Total Aversive Behavior		29	26	31		37		41		32
Child Abusive Cluster										
Mother Total Aversive Behavior										
Mother Abusive Cluster										
Target Boy Startup with Mother										
Target Boy Startup with Siblings	47	42	51	51	43	42	51	49	50	57
Target Boy Startup with Female Siblings	34		41	27			33	45	31	
Target Boy Neg Synch with Mother										
Target Boy Neg Synch with Siblings	33	31	50		41	29	32			36
Target Boy Neg Synch with Female Siblings					33					
Mother Backoff										
Observer Impression: Family Chaos										
Observer Impression: Target Boy Agg										

[a]All correlations are significant at *alpha* = 0.5 unless otherwise noted.

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TABLE 9.3B WAVE 1 PREDICTION OF WAVE 2 BSI SCORES FOR THE NONREFERRED COMPARISON (n = 38)[a]

	SOM	OBC	INT	DEP	ANX	HOS	PHO	PAR	PSY	GSI
Intake Problems										
Child Total Aversive Behavior										
Child Abusive Cluster										
Mother Total Aversive Behavior										
Mother Abusive Cluster										
Target Boy Startup with Mother										
Target Boy Startup with Siblings										
Target Boy Startup with Female Siblings										
Target Boy Neg Synch with Mother										
Target Boy Neg Synch with Siblings										
Target Boy Neg Synch with Female Siblings										
Mother Backoff			48	36		31	32	36		31
Observer Impression: Family Chaos										
Observer Impression: Target Boy Agg										

[a]All correlations are significant at *alpha* = 0.5 unless otherwise noted.

TABLE 9.4 WAVE 1 PREDICTION OF THE WAVE 2 CHECK HOSTILITY SCALE[a]

	Referred Group (n = 48)	Nonreferred Comparison (n = 38)	Full Sample (N = 86)
Intake Problems		(23)	
Child Total Aversive Behavior	(22)[b]	(19)	26
Child Abusive Cluster	(25)		(21)
Mother Total Aversive Behavior			
Mother Abusive Cluster			
Target Boy Startup with Mother	(26)		27
Target Boy Startup with Siblings	45		34
Target Boy Startup with Female Siblings	46		36
Target Boy Neg Synch with Mother	(16)		(19)
Target Boy Neg Synch with Siblings	49		32
Target Boy Neg Synch with Female Siblings	43		28
Mother Backoff			
Observer Impressions: Family Chaos			
Observer Impressions: Target Boy Agg			

[a]All correlations are significant at *alpha* = 0.5 unless otherwise noted.
[b]Numbers in parentheses indicate marginally significant correlations ($0.5 < p < .20$).

from middle childhood. In particular, note the strong predictive validities for negative interactions with siblings at Wave 1. It must be emphasized that there are essentially no statistically significant validities for the NC group.

Self-reported Conflict Tactics During Adolescence and Young Adulthood

The scoring of Straus's (1979) Conflict Tactics Scale (CTS) was completed, as described earlier, with three factors: verbal reasoning and discussion, low-amplitude coercive behaviors, and high-amplitude coercive behaviors. Participants reported conflict tactics for relationships relevant to them over the 12-month period just prior to Wave 2, including problem-solving interactions with their mothers and fathers, and for those boys 18 years of age and older, their interactions with a significant partner (girlfriend, wife, or lover) and friend as well. Participants were instructed to respond in two ways: first, as they perceived the other individual's strategies in dealing with them during a conflict; and, second, as they perceived their own strategies in dealing with the other individual during a conflict. Due to the large number of predictive validities generated, only those areas

with consistent patterns of coefficients are summarized in Table 9.5a (conflict tactics in relationships with fathers and mothers) and Table 9.5b (conflict tactics in relationships with partners and friends).

Tactics with Mothers and Fathers. Patterns of interaction at home during middle childhood did not affect current conflict tactics with fathers on the discussion factor as reported by RG boys; for NC boys, however, there was a clear pattern of negative coefficients, with lower discussion scores with fathers associated with Wave 1 startup and synchronous negative interaction variables with mothers and siblings (see Table 9.5a). Precisely the same results emerged for reported discussion with mothers, and in both cases the effect was bidirectional (i.e., reported as mutually used tactics).

For both the RG and NC boys, the low-amplitude coercion factor was not consistently predicted for conflict tactics with fathers or mothers, but for the RG the high-amplitude factor was significantly predicted for conflict tactics with both parents by

TABLE 9.5A WAVE 2 CONFLICT TACTICS FACTOR PREDICTED BY WAVE 1 OBSERVATIONS[a]

Father	Mother
Discussion:	*Discussion:*
NCs →	*NCs →*
(1) Mom startup, synchronous negative, and TAB all predict less discussion with father (both directions: *rs* = –.42 to –.66).	(1) Mom startup, synchronous negative, and TAB all predict less discussion with mother (both directions: *rs* = –.35 to –.62).
(2) Synchronous negative with mom and siblings predictive of less discussion initiated by subject to his father (*rs* = –.40 to –.49).	(2) Synchronous negative with mom and siblings predictive of less discussion initiated by subject to his mother (*rs* = –.36 to –.39).
Low-Amplitude Coercive:	*Low-Amplitude Coercive:*
NCs →	*NCs →*
High-Amplitude Coercive:	*High-Amplitude Coercive:*
RGs →	*RGs →*
(1) Startup with siblings is predictive of high-amplitude acts with fathers (both directions: *rs* = .43 to .51).	(1) Startup with siblings is predictive of high-amplitude acts with mothers (both directions: *rs* = .46 to .62).
(2) Synchronous negative is predictive of high-amplitude acts to father (*rs* = .34 to .48).	(2) Synchronous negative is predictive of high-amplitude acts to mothers (both directions: *rs* = .34 to .39).

[a]All correlations are significant at *alpha* = 0.5 unless otherwise noted.

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TABLE 9.5B WAVE 2 CONFLICT TACTICS FACTORS PREDICTED BY WAVE 1 OBSERVATIONS[a]

Partner	Friend
Discussion:	*Discussion:*
NCs →	*NCs* → Synchronous negative with siblings predicts poor communication with friend (both directions: *rs* = –.42 to –.57).
Low-Amplitude Coercive:	*Low-Amplitude Coercive:*
RGs → Subject's Wave 1 abusive cluster predictive of low amplitude acts with partner (both directions: *rs* = .54 to .62).	*RGs* → Subject's Wave 1 TAB and abusive cluster predictive of low amplitude acts with friend (both directions: *rs* = .42 to .55).
NCs → Subject startup with mom and siblings predictive of partner's low amplitude acts (*rs* = .41 to .59).	*NCs* →
High-Amplitude Coercive:	*High-Amplitude Coercive:*
RGs → Synchronous negative with siblings predictive of high amplitude acts to partner (*r* = .57).	*RGs* → Synchronous negative with mom predictive of high amplitude acts with friend (both directions: *rs* = .39 to .45).
NCs →	*NCs* →
(1) Startup with mom predictive of high amplitude acts with partner (both directions: *rs* = .55 to .57).	(1) Startup with mom and mom abusive cluster predictive of high amplitude acts with friend (both directions: *rs* = .44 to 70).
(2) Juvenile arrest predictive of high amplitude acts to partner (*r* = .48).	(2) Juvenile arrest predictive of high amplitude acts with friend (both directions: *rs* = .36 to .50).

[a]All correlations are significant at *alpha* = 0.5 unless otherwise noted.

observed negative interactions with siblings (primarily) and mothers during middle childhood (see Table 9.5a). No such results were obtained for the NC group.

Tactics with Partners and Friends. Discussion with partners was not significantly and consistently predicted by any Wave 1 variable, but for NC participants fewer reports of discussion as a conflict tactic with friends was consistently predicted by the boys' synchronous negative interaction patterns with siblings during middle childhood (see Table 9.5b). Low-amplitude coercive behaviors with both partners and friends were predicted for RG participants by their abusive behaviors (hit, yell, humiliate, and threaten; see Table 9.1) during Wave 1 home observations; total aversive behavior (see Table 9.1) also predicted

low-amplitude coercion with friends. For NC participants, the number of low-amplitude acts directed at them by their partners was predicted by their own startup behaviors with their mothers and siblings during middle childhood. High-amplitude coercive behaviors with partners and friends were predicted for the RG boys by Wave 1 synchronous negative interactions with their siblings and mothers. For the NC boys, however, high-amplitude behaviors were best predicted by Wave 1 startup with their mothers and by their juvenile arrest records. The magnitudes of these predictive validities are summarized in Table 9.5b.

Mean Differences Between the Groups. It is also worth noting there were largely consistent *mean* differences between the RG and NC participants in each category of the Conflict Tactics Scale (CTS). For example, RG means were higher than those for NC on all eight comparisons (mother, father, partner, and friend as directed to and from the participant) on the high-amplitude factor; precisely the same pattern was obtained with the low-amplitude factor comparisons, with the single exception of "mom to me" ($M = 11.5_{NC}$ versus 11.2_{RG}). Similarly, the discussion factor comparisons revealed lower means (i.e., less discussion) for RG as compared to NC on six of the eight scores, with no difference for "me to friend" and a slight difference for "friend to me" ($M = 11.7_{NC}$ versus 11.8_{RG}). All eight of the mean differences on the high-amplitude factor, and six of the eight on the low-amplitude factor, reached or approached statistical significance; only three of the eight discussion factor comparisons marginally approached statistical significance ($ps \sim .25$).

DISCUSSION

The most dramatic aspect of the current study is that data gathered during home observations, an average of 10 years prior to the Wave 2 collection of criterion data, are significantly and substantially predictive of a variety of adjustment outcomes for the Referred Group (RG) and Nonreferred Comparison (NC) participants. More specifically, it was hypothesized that negative interactions during middle childhood with siblings and parents would be the most powerful predictors of adjustment in adolescence and early adulthood, and this was indeed the case. It must be emphasized, however, that sample sizes were small for

all analyses, and these results should be looked on as only suggestive in nature.

Antisocial and Delinquent Behavior

Juvenile and adult law violations were significantly predicted by a variety of Wave 1 variables, as shown in Table 9.2. Juvenile crime was best predicted by mothers' high rate coercive behavior and especially by boys' "startup" with their mothers. This finding held for both the RG and NC boys. Contributions of sibling negative interaction variables to the prediction of juvenile arrests were not consistent across groups. On the other hand, prediction of *adult* arrests was consistently and significantly made by the targeted boys' synchronous negative behaviors with siblings during middle childhood, and these findings were obtained for both groups.

Psychopathology

Results were striking in this area. For the RG, startup and synchronicity with siblings significantly predicted all categories of the BSI (see Table 9.3). Thus, it may be that for aggressive youngsters in difficult home situations, opportunities to practice coercive behaviors with one's siblings during childhood not only increases the risk of coercive behavior in other contexts, but by adolescence and early adulthood also leaves the aggressive child with a strong sense of inadequacy, incompetence, and hostility.

Of note and consistent with our expectation, the NCs show absolutely no evidence of sibling interaction patterns leading to later psychopathology. Mother backoff is the only significant predictor of self-reported psychological problems on the BSI. This outcome was not hypothesized and is intriguing for several reasons. First, mother backoff is a critical variable in our theoretical framework as it defines the introduction of negative reinforcement to both the targeted boys and their siblings (see Figure 9.1). Second, this variable functioned as hypothesized in the prediction of juvenile arrests for RG but not NC boys. Mother backoff did not predict adult arrests as had been expected. With the consistent prediction of BSI subscales among NCs, it appears that in nonreferred families a lack of structure and contingent discipline techniques may produce children

with mental health difficulties by adolescence and early adulthood. It should be emphasized that poorly skilled parents are likely to fail with a more difficult child, regardless of whether the parent behaves coercively or tries to ignore (i.e., backoff from) the child's problem behaviors. The skilled parent is more apt to provide frequent opportunities for the difficult child to earn positive parental responses through appropriate behavior, while simultaneously responding to the child's negative behaviors with consistent (nonharsh) discipline.

Hostility Toward Women

The results from the Check (Wave 2) measure were simple yet disturbing. Wave 1 startup and synchronicity with siblings (and to a lesser degree with mother) strongly predicted later hostility toward women as reported by the RG boys. There were no significant findings for the NC boys on this criterion measure.

Thus, once again, it is our thinking that, in referred families, unsupervised siblings have nearly unlimited opportunities to practice and perfect negative interaction patterns with each other. The product of these hundreds—and possibly thousands—of practice rounds may be a firmly entrenched disregard for those they can victimize. In poorly functioning families, the boys' victimization of their sisters and mothers, in particular, may have led them to develop a disdain and disrespect for girls and women as weaker and less capable.

Conflict Tactics

This final area of adjustment outcomes addressed in the current study is summarized in Tables 9.5a and 9.5b. The results suggest that, by adolescence and early adulthood, RG as compared to NC participants are much more likely to use high- and low-amplitude coercive behaviors in attempting to resolve conflicts with parents, partners, and friends alike. Thus, childhood antisocial behaviors appear to produce, or at least predict, adult coercive relationships. Self-reports of communication strategies to resolve conflicts are similar across the RG and NC participants, although they are endorsed slightly more often by the NCs.

Note, however, in the tables that the use of communication strategies in conflict resolution is well predicted for the NCs, but not for the RGs. Thus, for the NCs, Wave 1 negative inter-

action patterns with mothers result in significantly fewer communication strategies in relationships with both parents during adolescence and early adulthood. Similarly, NCs with Wave 1 negative interaction patterns with siblings were more likely to report poor communication strategies with friends at Wave 2. These prediction patterns appear straightforward and sensible for the NCs, which follows that more positive communication patterns with parents and siblings at Wave 1 were predictive of similarly positive techniques in conflict resolution at Wave 2. The fact that communication strategies among the RG participants is not predicted by childhood variables is of interest; it is possible that the self-reported discussion tactics used by RG participants are qualitatively quite different from those of their nonreferred comparison counterparts.

Across all relationships assessed, the use of high-amplitude coercive behaviors by the RGs was typically predicted by negative interactions with siblings and to a lesser extent with mothers at Wave 1. By contrast, for the NCs, no high-amplitude behaviors with either parent were predicted by Wave 1 behavior patterns, but with friends and partners, both Wave 1 negative interaction patterns with mothers and juvenile arrest records were predictive of these more aggressive acts. Thus, for the RGs, negative sibling interaction patterns during middle childhood appear to be highly predictive of later adjustment patterns. For the NCs, although sibling relationships do appear to be significant predictors of a variety of outcomes, negative interaction patterns with their mothers may carry greater predictive power.

These findings are consistent with our theoretical framework suggesting that less skilled parents will be unable to supervise capably and discipline an antisocial child, and that such a child in a poorly supervised home setting is likely to victimize his sibling(s) and do so at a high rate. As depicted in Figure 9.1, it is our position that the aggressive child will then use these highly practiced "skills" in other settings and in other relationships. The nonreferred comparison families in this study were, of course, not without their problems, too. Nonetheless, it is our expectation that, in general, more skilled parents were at work in these families and, consequently, there would have been significantly fewer opportunities for an aggressive child to victimize his sibling(s). As noted earlier, those NC boys who were arrested as juveniles were usually arrested only once; these boys were less frequent and perhaps less serious offenders than the RG boys with large numbers of arrests.

Unanswered Questions

Several questions remain to be addressed. First is the issue of whether the results of this study will be replicated. The reader is cautioned to view the results reported here as tentative and only suggestive due to the small sample sizes for most analyses and the need for replication. For example, although the results of this study are consistent with the critical hypotheses, certain questions have arisen, such as the role of mothers' negative reinforcement of children's coercive behaviors; current results suggest developmental trajectories with different kinds of difficulties (i.e., delinquency versus other psychopathology) for coercive and noncoercive children who experience similar maternal behavior.

In addition, there is already substantial evidence to suggest that siblings of coercive children are also at high risk for poor adjustment outcomes (e.g., Arnold et al., 1975; Dadds et al., 1992; West & Farrington, 1973). Longitudinal study of siblings' development will be necessary to understand how such effects may manifest. Furthermore, what is the developmental trajectory for sisters of coercive boys? We might expect increased psychopathology for these girls in adolescence and adulthood, but little work has been accomplished in this area.

A newly funded study designed to answer these and other questions has just begun at our Center. Thus, we hope to make significant progress in understanding sibling development over the next few years.

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